Improving Goat Productivity through Introducing Superior Breeding Buck and Artificial Insemination

Enhancing Livelihoods of Smallholder Farmers in Central Terai District of Nepal- ELIVES

Enhancing Livelihoods of Smallholder Farmers in Central Terai Districts of Nepal (ELIVES) project is a 3 year project funded by DFID and co-funded by ADRA UK and is implemented in four districts of Central Terai region (Bara, Rautahat, Sarlahi and Mahottari) from April 2015. The ELIVES project combines key strengths of project partners - ADRA Nepal, iDE and FORWARD Nepal and district-based partners (LNGO) to enhance livelihoods and income for poor and marginalized smallholder farmers with a focus on women and socially excluded groups in particular, Dalits, Janajati and Madhesi.

The project aims to bring tangible change in poor people's lives though interventions on goats, vegetables/lentil and market access/promotion. The project worked with 600 farmer groups comprising over 13,000 HHs. The project's work in developing local service providers and building market systems has ensured that the beneficiaries continue to get services and access to market and also benefitted the wider community. The end line survey revealed that skill enhancement in vegetable and goat production, coupled with increased access to services and markets increased annual income by £80 for 66.5% of beneficiaries.

Background

Meat is an important source of human nutrition. Meat consumption is gradually increasing worldwide, Nepal being no exception. In several places in Nepal, local meat production is not keeping the pace of its increasing demand partly because locally raised livestock are not highly productive. The local and cross-bred goats popularly raised by farmers grow slowly and their body mass or weight is small. Due to their poor growth rate, local goats are uneconomical when fed with food grains and other concentrate foods. Poor performance of the existing goat breeds is also attributable to continuous inbreeding because mating occurs continuously between animals belonging same breed.

One way to improve productivity of local goats is to make a crossing between local and high yielding exotic breeds. Artificial Insemination (AI) of semen of high yielding exotic breeds is also an option to improve goats' genetic characteristics and productivity. The new breeds can grow and gain weight faster so that they attain marketable size faster than existing breeds. However, smallholders cannot afford to buy expensive breeding bucks (he-goat), nor do they have knowledge and skill to handle AI. Hence, promoting such technologies requires concerted and coordinated efforts.

The ELIVES project has been supporting smallholder women farmers with breeding bucks of high yielding breed and AI service in order to improve genetic traits of local breeds and improve productivity and production of goat in Bara, Rautahat, Sarlahi and Mahottari districts. This intervention is giving promising results in smallholder-dominated communities.

Methodology

The project follows two approaches for improving local goat stock and productivity. The major approach was to introduce superior quality breeding buck in farmer groups. In some cases, the breeding bucks are not compatible with the local female goats due to difference in size and bucks are also not readily accessible locally. Hence, AI was introduced in such cases to introduce exotic breeds such as boer as no direct mating is required. The detailed procedure is discussed below.

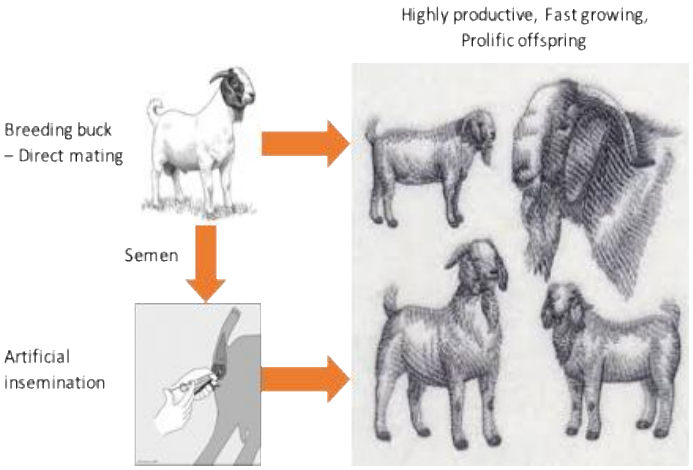

Figure 1. A figure showing the process of breeding buck distribution and AI services

1. The project forms goat raising farmers' groups by bringing together identified smallholder farmers.
2. Farmers are trained on animal health and management practices, fodder and forage, feed management, shed management and the importance of controlling inbreeding.
3. Farmer groups receive a breeding buck from the project. Bucks were sourced from got resource centers in Saptari and Sindhuli districts. In majority of cases, Jamunapari and Khari cross breeds were provided due to their availability and local compatibility. The project was unable to source boer breed due to their unavailability and high cost.
4. The group decides a member to raise the breeding buck and also prepares buck management guideline. The guideline includes the cost of service, sharing of buck service, plan of buck exchange after his offspring reach puberty to avoid inbreeding. The group also decides on sharing benefits and costs when old buck has to be disposed and new buck needs to be purchased.
5. When a doe comes in heat, the owner takes doe to the place where breeding buck is raised for mating. For this service, the service recipient pays her/his fee. Usually, most groups have decided to charge non-group members slightly more than the group members. Repeated service is available at no extra cost if the doe does not conceive.

To deal with poor supply of breeding bucks and their incompatibility in some goats, the project introduces an alternative method called Artificial Insemination (AI) where semen of exotic breed is artificially inserted into doe's ovary. For artificial insemination, following approaches are taken.

1. AI training was provided to DLSO staffs, private inseminators and project staffs.
2. The project supported equipment such as refrigerator, cool box, nitrogen containers and AI gun to agro-vets that are partnered to develop supply chain of AI. AI service is initiated in collaboration with District Livestock Service Office (DLSO) which was useful in sourcing semen of different exotic breeds including Boer from the Semen Production Lab in Pokhara under Department of Livestock services.
3. The project started AI piloting directly at first, but private agro-vets and inseminators were engaged later with a purpose to develop supply chain.
4. Heat stimulating drugs were applied at the beginning to administer AI. However, it was discontinued later, and AI was done when the doe comes in natural heat.

Outcomes and Impacts

Minimized inbreeding problem due to easy access to breeding buck service

The availability of a buck with superior characteristics in the village coupled with enhanced knowledge on the disadvantages of mating close relatives, farmers started taking the service of the breeding buck for their goats. They are willing to pay NPR 50 which is cheaper than NPR 100 charged to non-members. Farmers reported an improvement in the size of kids during birth, increased twinning rate and faster growth.

Size, productivity and income

Since kids are larger and grow faster than locals, they also fetch more money in less time. About 8-9 months old goat fetches around NPR 20,000 whereas the local goats with same age fetch only around NPR 8,000-9,000. The project provided 405 breeding bucks to farmer groups. About 90% are actively providing services and rest died due to various reasons. More than 20,000 kids of improved breeds have already borne from these bucks. Average number of kids fathered by the bucks made available by ADRA is more than 50. Introduction of breeding bucks by the project tremendously helped in increasing the production and productivity of local goat stock.

AI potential demonstrated

Out of 228 goats inseminated artificially, about 30% success rate was achieved. An ADRA survey unravels that willingness to pay for AI service is low for semen of common breeds (such as Jamunapari) but farmers are willing to pay more for semen of exotic breeds with high productivity potential such as Boer. Further, there is potential for leveraging resources locally and creating impact at scale since in several places, local governments have shown interest in subsidizing AI services to improve local goat productivity.

Key Learnings

- Breeding bucks should be compatible in terms of local environment (weather condition, feeding practice) and local breeds (size). Otherwise, chances of failure are high mainly due to poor rate of conception.
- About 10% buck mortality was observed although not all deaths were related to diseases. Overfeeding of food waste was also cause of buck death. Therefore, it was realized that farmers need to be trained on appropriate buck raising techniques so that their proper growth, maintenance and health are maintained.
- Having a buck management guideline with a set of rules to manage breeding buck was helpful. A good benefit sharing mechanism on revenue generated by breeding would motivate both the caretaker farmer to keep the buck appropriately as well as the group members to utilize services and monitor the wellbeing of the buck. The rule should also specify how the buck will be disposed/exchanged after its serviceable age or when his kids reach puberty. It should also specify

the mechanism to purchase new buck for sustainability of breeding service after the disposal of the breeding buck.

- The project did not require farmers to contribute towards the breeding buck purchase. It would contribute to farmers ownership and good keeping, if farmers contribute at least 10% of the cost. A small part of this money can be utilized to get the buck insured for risk protection and rest can be put in the groups saving and credit fund with a provision to utilize it for the treatment of buck if needed.
- It is also important that the over-service is avoided to keep the vigor of breeding buck intact and for its wellbeing.
- AI has been piloted in some groups, but success rates are about 30% and the cost ought to be high. If this issue is solved, AI using semen of exotic breed with high growth potential could get popularity since the products are relatively larger and grow faster than local breeds and there is no concern of compatibility with local breeds. Moreover, the hassle of feeding and growing a buck is nil. Lack of sufficient AI services and facilities and poor accessibility also cause low adoption of AI in addition to the high cost of services. Therefore, developing the supply chain of AI service (availability of semen and trained inseminator locally) should go concurrently with promotional activities by local governments to increase its adoption.

Case Study 1: Impact of Breeding buck

Farmers from the mostly Magar community in Belgachhi, Gausala Municiality-8 of Mahottari district got excited with the offer of a buck of an improved breed from the neighboring district from the ELIVES project. Earlier, the farmers were facing several problems in their goat farming and profit wasn't satisfactory. The new breed has given hope to the farmers in goat business and many have started commercial farming but still at a low scale. The easy and cheap availability of breed buck in their village has been a great boon. The kids are larger in size, grow faster and fetch higher price in the short span of time than local breeds. Looking at their enthusiasm the project imported another breeding buck to their community and they are planning to develop the community as a resource center in future with an aim of expanding their business or services to other villages.

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